

## PIGMY RIGHT WHALE (*CAPEREA MARGINATA*) IN SOUTH AUSTRALIAN WATERS, PART 2<sup>(1)</sup>

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Plate 48 and text fig. 1-4

### SUMMARY

Skeletal parts of four of seven Pigmy Right Whales stranded on South Australian coasts are discussed in some detail; three are of juveniles, one of an old adult. Body measurements of one young male are given.

The skull of an old example, compared to that of juveniles about nine feet in length, exhibits considerable growth changes. In all material in hand the length of the skull is approximately one-fourth of the length, or estimated length, of the entire skeleton.

### INTRODUCTION

The known strandings of *Caperea* on South Australian coasts occurred in a restricted area bounded by the north coast of Kangaroo Island and the southern part of Eyre Peninsula. Also, at Victor Harbour, near the western end of Encounter Bay, and not far from Kangaroo Island, one juvenile became fouled in a fishing net in shallow inshore water. The localities are adjacent to, or at, the entrances to Spencer Gulf and Gulf St. Vincent. Although a good number of whales of other species have been seen in these gulfs, or have come ashore, there is to date no record of the Pigmy Right Whale travelling north into them, or coming to grief in the shoals there as have many other whales.

Seven definite records of *Caperea* in South Australia are now available; two are from the north coast of Kangaroo Island, the one accidentally netted at Victor Harbour, three from Port Lincoln Bay, on the western side of the wide entrance to Spencer Gulf (southeastern coast of Eyre Peninsula) and one from Coffin Bay on the west coast of the Peninsula, opposite to, and only 30 miles from, Port Lincoln, which is one of South Australia's foremost fishing ports, situated on Boston Bay, immediately north of Port Lincoln Bay.

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(1) Part 1, see Records South Aust. Mus., iv, 1931, pp. 314-319, fig. 1-4.

The last example to be observed was an adult female which came ashore on August 16, 1960, on mud flats near "Tulka" (referred to below) in Port Lincoln Bay, in an advanced stage of decomposition. Unfortunately, because of urgent commitments, this specimen could not be secured at the time, and subsequently it disappeared.

On July 7, 1960, a *Caperea* accompanied by its calf was seen in Port Lincoln Bay and it seems probable that the female was the one stranded five weeks later.

Guiler (1961, p. 297) records a pregnant female stranded on a Tasmanian coast towards the end of June, 1961.

Some years ago the writer prepared a popular article, published in country newspapers, detailing the characters by which whales, particularly small and insufficiently known species, may be recognized. Following this, and the 1960 stranding, officers of the Fisheries and Game Department at Port Lincoln stated that it is not uncommon for Pigmy Right Whales to appear in "Proper Bay" (the local name for Port Lincoln Bay) during the winter and that from time to time several had been stranded near "Tulka" but had not been reported.

Port Lincoln Bay shoals towards its western end, where extensive mud flats are exposed at low tide. Whales occasionally come ashore on these flats, particularly in the vicinity of "Tulka", a homestead at the south-western part of the Bay and eight miles from Port Lincoln town. The same thing occurs in Coffin Bay.

J. E. Hamilton (1952, p. 2) suggests that Byron Sound in the West Falkland Island may act as a "sort of trap" and "that panic at finding themselves in narrow and shoaling waters may have resulted in the stranding of these whales", viz., *Globicephala*, *Physeter*, *Orcinus*, *Balaenoptera* and the Pigmy Right Whale. This pertinent suggestion might well apply to the bays of southern Eyre Peninsula, while the Kangaroo Island strandings of *Caperea* occurred in shoal waters partly enclosed by a long sand bank locally known as "The Spit".

An eighth record is afforded by a tympanic bone recorded by Zeitz (1890, p. 8) who stated, after recording the occurrence of the juvenile from Victor Harbour "besides which there is an ear bone from the former locality". This bone has not yet been located in the Museum collections, but the identification is assumed to be correct as Zeitz had the advantage of direct comparison with the tympanics of three other skulls.

## MATERIAL IN SOUTH AUSTRALIAN MUSEUM

The specimens housed in the Museum, dealt with herein and in Hale, 1931, are as follows:

- M.1593. Sex unknown. Mounted skeleton with some bones missing. Brownlow, north-east coast of Kangaroo Island. Stranded October 21, 1884.
- M.2966. Young male. Disarticulated skeleton and baleen. Victor Harbour. Entangled in fisherman's net. September 13, 1887.
- M.2967. Young male. Plaster cast of head. Point Marsden, north-eastern coast of Kangaroo Island. Stranded October 21, 1889.
- M.5753. Juvenile, sex unknown. Skull and part skeleton. South-western end of Port Lincoln Bay. Stranded prior to 1948.
- M.6110. Young male. Disarticulated skeleton. South-western end of Port Lincoln Bay. Stranded December 26, 1955.
- M.6111. Adult, sex unknown. Coffin Bay. Stranded about 1950.
- M.1593. Brownlow, Kangaroo Island

*Neobalaena marginata* Hale, 1931, p. 314.

The articulated skeleton previously briefly described by me is that of one of "three individuals in the flesh . . . received at the Museum" (Zeitz, 1890, p. 8). The skeleton now hangs in a position where it is more easily accessible than before. In 1931 the vertebral counts was given as cervical, 7; thoracic, 17; lumbar, 3; caudal, 14. In view of the fact that the sternum, first chevron and bones of the left limb are missing, it is probable that a seventeenth short and slender pair of ribs were also lost through careless maceration. In such case the thoracics number 18 and the lumbar 2, an attachment for the first and missing chevron being present posteriorly on the centrum of the second lumbar.

This Kangaroo Island example was about 16 feet in length.

The skull of this example is in general as shown in Beddard's figures (1903, pl. VII-IX), with the vertex not much posterior to the nasal bones.

M.2966. Victor Harbour, young male

*Neobalaena marginata* Hale, 1931, p. 315, fig. 1.

Skull 70 cm. in length (see table 1). A specimen nine feet in body length.

*Skull.* Viewed from the side the supraoccipital rises in the posterior half to form a rounded elevation, so that the vertex of the skull is well behind the middle of the length of the supraoccipital. In front of the tumidity the contour is concave, with a median longitudinal ridge extending from the anterior end of the supraoccipital to the vertex. About 2 cm. anterior to each occipital condyle there is a well marked low elevation, 3-4 cm. in diameter.

The nasals, where exposed, are symmetrical, the inner faces fused ventrally but separated above by a deep groove for the whole length of the bones, including the anterior ends.

*Vertebrae.* In my first record of this example I stated that the epiphyses are "not, or not completely, anchylosed". In fact, as far as can be made out, the epiphyses are all free but several show traces of a composition which had been used to fasten them to the centra.

The cervicals are fused but are not thoroughly coalesced. The postero-lateral portions of the neural arches of the last two are incompletely anchylosed while between the centra of five to six there is on the left side a slit through which may be seen the edges of the remnants of the epiphyses. Again, the centra of the sixth and seventh are completely fused only in the ventro-lateral parts of the left side, while fusion has begun on the right side in the same position; otherwise the centra are narrowly separated and between them can be seen the remains of the two epiphyses; the upper portions of these last, comprising the dorsal halves of the epiphyses, are fused ventrally, while below the visible lateral edges of the lower parts of the epiphyses are anchylosed. The cervical mass is wider than high (165:130); the combined dorsal processes are equal in depth to the neural canal, with the contour of the upper edge convex.

The first thoracic, as in the other thoracics, has the neural arch complete and has a short dorsal process, rounded apically and subtriangular when viewed from the side; the neural canal is very slightly deeper than wide, its depth less than one-third the total height of the vertebra (cf. M.5793, etc.).

In the second to sixth thoracics the neural canal is deeper than wide (cf. M.5753); the dorsal process of the third is wide, little more than one-third of the total depth of the vertebra, with subparallel sides, and the height less than one and one-third times the greatest width (48:38).

The fourth to fifteenth thoracics have the dorsal process longer and wider, dilated towards the distal end which is subtruncate; the

tenth has a dorsal process which is one-half the total height of the vertebra, and with its greatest width much less than half its height (54:80).

The neural canal becomes an open groove on the seventh caudal.

*Ribs.* See table 2.

*Sternum.* See fig. 1.

*Remarks.* It will be noted in table 1 that there is less difference between the overall and condylobasal lengths of the skull of the Victor Harbour male than that of other skulls described herein; this is due to the lesser backward prolongation of the exoccipitals, etc.

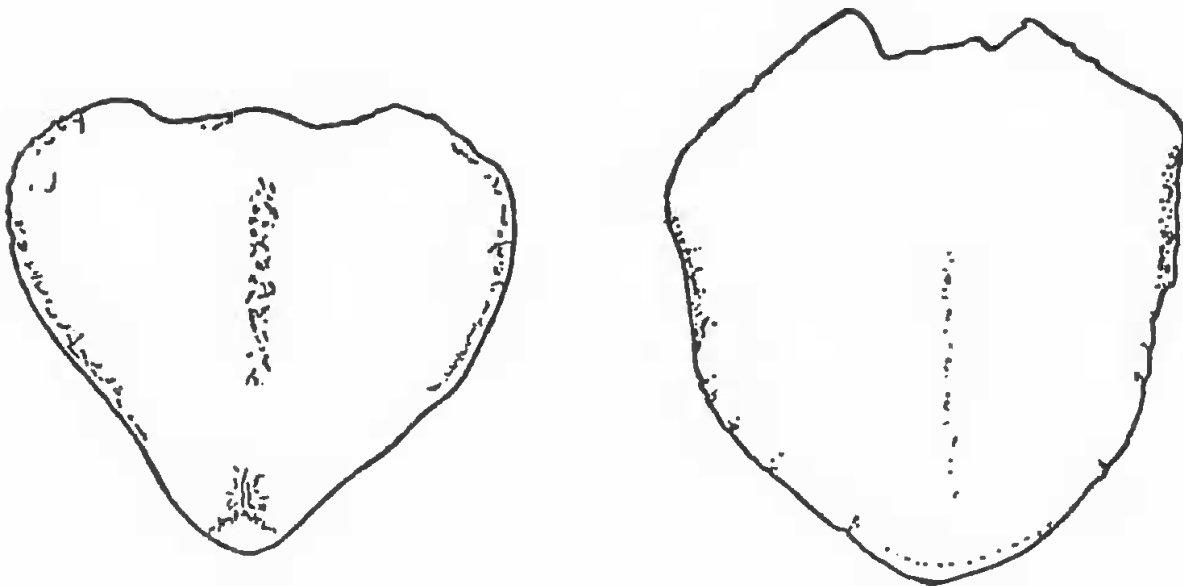


Fig. 1-2. Ventral side of sterna of *Caperea*, from specimens nine and ten feet in body length ( $\times \frac{5}{4}$ ).

M.2967. Point Marsden, Kangaroo Island.

*Neobalaena marginata* Beddard, 1903, p. 107; Hale, 1931, p. 316, fig. 2 and 3.

First five cervicals completely fused; neural arches and centra of sixth and seventh partly free. Epiphyses of vertebrae not fused with centra. Seventeen pairs of ribs (*vide* Beddard). Young male, almost 11 feet in length (*vide* Hale following Stirling's unpublished notes).

Skeleton in Cambridge University Museum. Plaster cast of head in South Australian Museum.

M.5753. Port Lincoln Bay. Sex unknown.

Skull 67 cm. in length (see table 1).

A young example stranded prior to 1948; judging by the length of the skull the total body length would have been no greater than that of the Victor Harbour young male (M.2966 herein) previously recorded (Hale, 1931, pp. 315-316, fig. 1, and Davies and Guiler, 1957, pp. 58-582.)

The following bones of specimen M.5753 were subsequently brought to the Museum by Mr. G. Cramer.

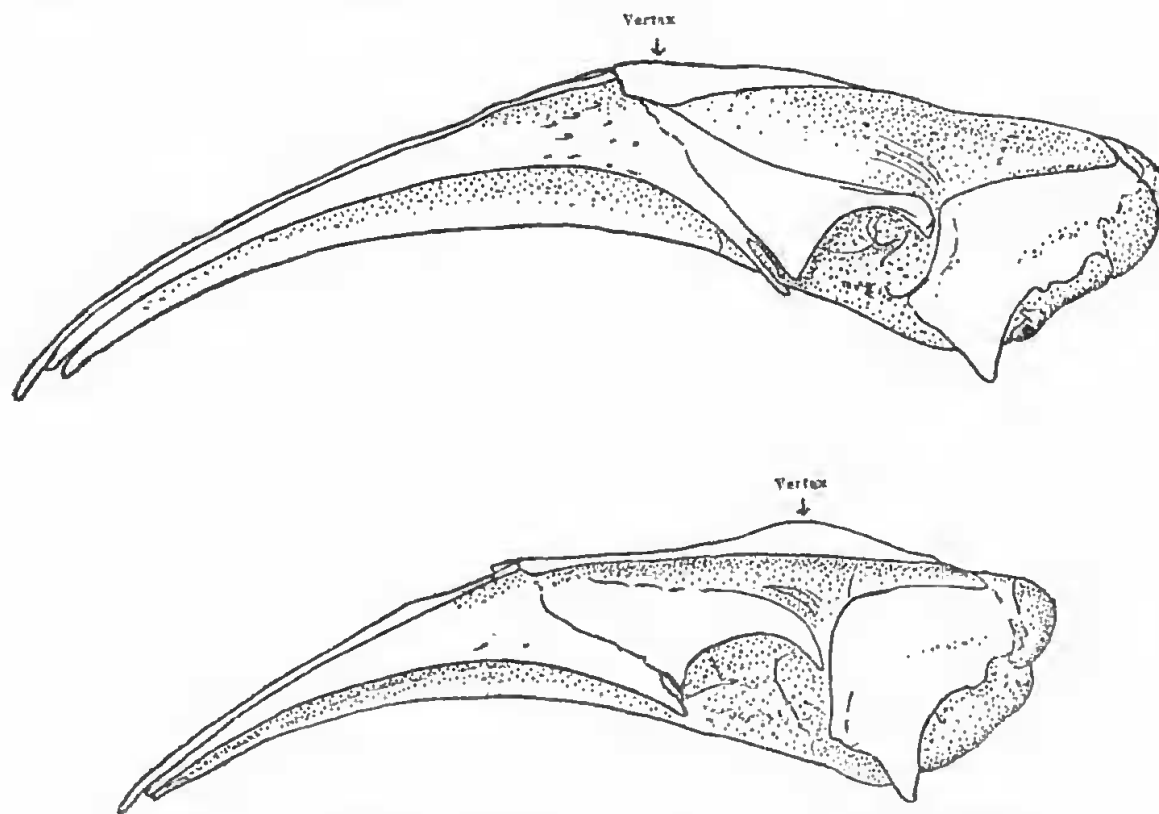


Fig. 3-4. Skulls of *Caperca*; 3, 670 mm., and 4, 1,575 mm., in overall length (scales very disproportionate).

*Material.* Skull, with squamosal and exoccipital of one side missing; rami of lower jaw with distal portions missing. There were seventeen pairs of ribs but in the first, sixth to eighth and fourteenth only one of the pair was recovered. Cervical vertebra; eleven thoracics, only one to four in sequence; six of the caudals, the first five in sequence; a few chevrons.

*Skull.* Fig. 3. As in the Victor Harbour young male (M.2966), the greatest height occurs in the posterior half of the supraoccipital, where there is a similar marked rounded hump at the level of the

postero-lateral angles of the frontal; anterior to this the supraoccipital is shallowly concave, with the median longitudinal ridge short and becoming obsolescent well in front of the abovementioned tumidity. This supraoccipital hump rises above the dorso-lateral edges of the supraoccipital when the skull is viewed from the side. There is also a small and low dorsal tumidity in front of, and about 2 cm. from, each occipital condyle.

Nasals, where exposed, symmetrical, completely fused, the junction represented by a shallow groove which does not reach the anterior ends.

*Vertebrae.* Epiphyses are completely free on the posterior face of the centrum of the last cervical and on both anterior and posterior faces of all other vertebrae available.

All cervicals are fused into a solid mass excepting that ankylosis is asymmetrically not fully complete in the lateral parts of the posterior neural arches. The mass is nearly half as wide again as deep (195:135) and the combined dorsal processes are low, subequal in depth to the neural canal, and in profile gently convex, highest at anterior third of length.

The first thoracic has the neural arch complete, with a short rounded dorsal process; the depth of the subtriangular canal is equal to one-third of the greatest height of the vertebra and is distinctly wider than deep. In the second thoracic the neural arches are separated dorsally (3 to 4 mm.). The third and fourth have the neural canal a little wider than deep; the dorsal process of the third is narrow and tapering to the apex; it is approximately one-third the depth of the vertebra and is about twice as high as its greatest width; that of the fourth is longer and wider, rounded on upper edge. The thoracic presumed to be the tenth has the dorsal spine with upper margin semicircular, the sides subparallel, and with greatest width less than half its height (45:83); as with the other available thoracics this process is not at all constricted in the proximal half, and is equal to about one-half the total depth of the vertebra; the neural canal has become smaller than in the preceding vertebrae and is as wide as deep.

*Ribs.* See table 2. The first is less dilated at the distal end than in older examples and also in one of the first pair in M.2966. This may be due to erosion during maceration, or, possibly, the first ribs in the young are not necessarily symmetrical.

*Scapulae.* Deeper than in M.2966 and with acromion wider and coracoid about twice as long.

*Remarks.* Apart from the scapulae the most apparent differences from the skeleton of the Victor Harbour young male, M.2966, which is of comparable size, are the shorter anterior dorsal carina on the supraoccipital, the completely fused nasal bones, and the larger vertebrae in relation to the skull length, with the dorsal processes of the thoracics dissimilar in shape; there is also some variation in the ribs (see table 2).

M.6110. Port Lincoln Bay. Young male.

Skull 84 cm. in total length (see table 1). A juvenile 10 feet in body length, collected by members of the Museum staff.

This example was noticed swimming sluggishly on or about December 25, 1955; it was stranded on December 26 near "Tulka", 8 miles south of Port Lincoln, and was then photographed by Mr. Howard W. Dorward and Mr. C. L. Gill (see plate 48); these, as in the other photographs published by me in 1931, show the white band along the upper jaw and above the baleen, referred to by Davies and Guiler (1957, p. 581).

A fisheries inspector, Mr. D. E. Barnes, informed us of the stranding and the specimen was "fleshed" on the spot by two members of the Museum staff on January 6, 1956. It was then noted that the unfortunate creature had been peppered with bullets from a small calibre rifle; the specimen by this time was considerably decomposed, so no colour notes were possible.

*Material.* Complete skeleton, but with dorsal processes of six thoracics damaged.

Measurements in the flesh.

	mm.
Total length, in a straight line, to middle of tail flukes . . .	3,050
Tip of snout to eye . . . . .	685
Tip of snout to genital slit . . . . .	2,140
Tip of snout to origin of dorsal fin . . . . .	2,230
Tip of snout to axilla . . . . .	1,070
Length of eye . . . . .	40
Length of gape . . . . .	610
Length of dorsal fin (approximately) . . . . .	155
Height of dorsal fin . . . . .	155
Greatest length of pectoral limb . . . . .	305
Width of caudal fin . . . . .	610

The above measurements were secured by the collectors, Messrs. G. F. Gross and A. Rau. It was noted that the caudal fin had a central notch.

*Skull* (see table 1). The supraoccipital is elevated in the posterior half but distinctly less so than in the two smaller examples (M.2966 and 5753). Also, the median dorsal ridge is conspicuous, almost



continuous, fading out about three inches before the anterior end of the bone and not quite reaching the foramen magnum. The anterior part of the supraoccipital, in front of the low dorsal hump, is more elevated than in that of the skulls of the two young about nine feet in length. The dorso-lateral occipital edges are strongly produced, not evenly curved as in the smaller skulls, but sinuous and slightly upturned at about the middle of their length. The low dorsal tumidities in front of the condyles are still apparent.

The exposed parts of the nasals are fused but the dorsal groove is rather wide and deep. No suture is apparent between the fused basihyal and thryohyals.

*Vertebrae.* Cervical, 7; thoracic, 18; lumbar, 2; caudal, 15; chevrons, 6.

The cervicals are fused together but not completely so; the lateral processes of the last five are partly free on both sides while the centra of the sixth and seventh are defined by a pair of very short lateral slits, inside which may be seen, in each, remnants of the two epiphyses; ventrally there is a short space between the sixth and seventh, again with the fused remains of a pair of epiphyses. The greatest width, across the lateral processes of the first cervical, is much greater than the height (202:142) and the combined dorsal processes, which slope forwards, are subequal to the depth of the distinctly wider than deep neural canal.

Epiphyses are completely free on the last cervical (posterior) and all other vertebrae, both fore and aft.

The first thoracic has the neural arch complete, the distally rounded dorsal process one-fifth the total height of the vertebra and the neural canal wider than high. In the second the width of the canal is subequal to the height, in the remaining thoracics it is higher than wide. The dorsal process of the third to eleventh thoracics are broad, slightly dilated and rounded at distal ends.

In the caudals the neural canal becomes a short open groove on the eighth.

*Ribs* (see table 2). The first rib, relatively, is more expanded than in other young examples examined, including that of the mounted specimen M.1593, and also in this rib as illustrated by Beddard (1903, pl. IX, fig. 6). Its length is less than two and one-half times the distal width, and its breadth distally exceeds the greatest width of any of the other ribs.

*Sternum.* Fig. 2. Irregularly subcordate, longer than wide, concave above for anterior three-fourths of length and with well developed, elongate and asymmetrical articular facets for attachment of first ribs.

*Scapulae.* As shown by Beddard (1903, plate VI) but with upper edges not at all sinuous, but evenly curved.

*Remarks.* The photographs reproduced on pl. 48 herein show the "bowhead" character referred to by Davies and Guiler (1957, p. 580, fig. 1).

M.6111. Coffin Bay, Eyre Peninsula. Sex unknown

Skull, 157.5 cm. in total length (see table 1). Part skeleton of a fully adult example collected by members of the Museum Staff.

*Material.* Skull and mandibles. Vertebrae: cervical, 7 and 30 other vertebrae. In the absence of a complete suite of ribs it is assumed that 18 are thoracic, 2 lumbar, and caudal 10 plus ? Scapulae are available but the sternum, pelvic bones and chevrons are missing.

The bones noted above, before recovery for the Museum, were standing under a tree on the property of the late Mr. J. Mortlock. A fisherman who knew of the stranding of this large example stated that it came ashore about 1950. Mr. J. G. Haggarty, then caretaker of the Mortlock station, later supplied a photograph of the animal secured soon after it was stranded and this shows the "bowhead" as illustrated by Davies and Guiler (1957, fig. 1). In the paper of the last named authors the locality, as supplied by me, is given as Port Lincoln, but subsequent enquiry revealed that the animal was stranded on a beach at the entrance of Coffin Bay, in the south-western coast of Eyre Peninsula and opposite to Port Lincoln on the south-eastern coast. A Sperm Whale, 42 feet in length came ashore here in late May, 1956, and from reports of a late officer of the Fisheries and Game Department, then stationed at Port Lincoln, Coffin Bay also is a "trap" for whales.

The length of the skull, as supplied to me (4 feet, 7½ inches) and sent to Dr. Guiler, is obviously the length from the anterior margin of the foramen magnum to the tip of the rostrum whereas the overall length is 1,575 mm. Thus it is apparently the largest skull known to date and it would seem that the body length of the animal may have been somewhat in excess of 21 feet. The vertebrae indicate that it was an old individual.

It is possible that there are other discrepancies in the lengths of skulls given by Davies and Guiler, as for example in the Kawau Island skull, in which the skull length was taken from "snout to occipital foramen".

*Skull* (see table 1). There is a marked difference in the dorsal profile with that of examples with skull 67 cm. to 70 cm. in total length. The dorsal ridge is strongly elevated for almost the anterior two-thirds of the supraoccipital and the vertex occurs immediately behind the nasals.

The sharp-edged occipital expansions are much more prominent than in smaller skulls, and for the posterior two-thirds of their length are inclined upwards instead of slightly downwards, so that, viewed from the side, the posterior part of the profile of the supraoccipital is not visible, as it is in the small skulls.

For about one-third of the length of the supraoccipital the dorsum is flattened and the pair of bosses immediately above the condyles are obsolescent.

*Vertebrae.* The epiphyses are thoroughly fused, and incorporated with, the centra of all vertebrae available.

The cervicals are fused into a solid mass excepting for the usual elongate foramina between the lateral processes. There are traces of the fusion of the dorsal processes in the last three, most distinct in the sixth-seventh. The combined dorsal processes are more elevated than in the young and the mass is relatively wider (420:270); the width in relation to the height remains approximately the same, however, the greater elevation of the dorsal processes having been accompanied by a proportional widening of the lateral processes of the mass.

There is a prominent facet on each side of the dorsal processes of the first and second vertebrae, oval in shape, and 30 to 40 mm. in depth.

The first thoracic, as in the other dorsal vertebrae, has the neural arch complete; the neural canal is deeper than wide. The canal is markedly deeper than wide in the second, and is deeper than wide in all of the other thoracics. The dorsal processes, apart from that of the cervicals, are much as figured by Beddard but from the eighth backwards the apex is rounded, allowing for the fact that the seventh is broken; in any case, this is a variable feature. The lateral processes are relatively wider than in younger examples, particularly noticeable from the tenth backwards.

In the eighth caudal the neural canal becomes a very short open groove.

*Ribs* (see table 2). Only eight pairs, third to eighth, eleventh and fourteenth, are amongst the total of twenty-two individual ribs in hand; none is available posterior to the fourteenth. The eleventh to fourteenth are damaged proximally and distally so that their lengths given in the table must be taken as approximate.

There is a marked thickening of all ribs, particularly apparent in the posterior ones as compared to the condition of the very young in which the dilation is almost wafer-like as the hinder edge is approached.

*Scapulae*. Much as figured by Beddard (1903, pl. VII). The dimensions are: width 53 cm.; depth 30 cm.

## SKULLS

TABLE 1. THREE JUVENILES, 9 FEET TO 10 FEET IN LENGTH, AND ONE ADULT, C. 21 FEET

Registration Number....	M.2966		M.5753		M.6110		M.6111	
	mm.	Per Cent	mm.	Per Cent	mm.	Per Cent	mm.	Per Cent
Overall length .....	700	100.07	670	104.68	840	103.70	1,575	105.70
Condylbasal length .....	695	100.0	640	100.0	810	100.0	1,490	100.0
Length from anterior margin of foramen magnum to end of rostrum .....	655	94.2	565	88.2	760	93.8	1,420	95.3
Length of supraoccipital from anterior margin of foramen magnum .....	265	38.1	290	45.3	315	38.8	570	38.2
Anterior end of supraoccipital to tip of rostrum .....	390	56.4	275	42.9	445	54.9	850	57.0
Postero-lateral processes of maxillae to end of rostrum ...	475	68.2	430	67.1	570	70.3	1,105	74.1
Postero-lateral processes of maxillae to level of posterior of exoccipitals .....	225	32.3	240	37.5	270	33.3	470	31.5
Depth of maxilla at level of anterior margin of supra-occipital .....	98	14.1	100	15.6	98	12.1	195	13.0
Greatest height of skull .....	205	29.5	205	32.0	210	25.9	470	31.5
Width between squamosals ....	370	53.5	—	—	410	50.6	770	51.6
Width between postero-lateral processes of frontals .....	330	47.4	365	57.0	380	46.9	750	50.3
Width of frontal at concave outer margin .....	95	13.6	103	16.0	115	14.2	180	12.0
Width across occipital condyles.	115	16.5	125	17.9	120	14.8	205	13.7
Length of mandible .....	550	79.1	—	—	680	83.9	1,280	85.9
Depth of mandible at coronoid..	75	10.7	75	11.7	85	10.4	185	12.4
Depth of mandible at middle of length .....	60	8.6	80	12.5	80	9.8	225	15.1

M.2966 and M.6110 are young males ; the sex of the other two is unknown.

M.2966 and M.6110 are young males; the sex of the other two is unknown.

In these young males, where the length of the animal is known (nine and ten feet) the skull is less than four times in the total length of the skeleton, while in a Kangaroo Island specimen about 16 feet in length (M.1593 herein), it is only slightly more than four times in the length. In Beddard's figure of a skeleton a little more than 13 feet in length, the proportions are shown as four and one-half times in the total length, although this author states "The proportions of the length of the skull to that of the entire skeleton including the skull are as 1:5½" (Beddard, 1903, p. 101, and pl. VII).

All length measurements, and the heights of the skulls, in table 1 are parallel to, and at right angles to, a median base-line, taken from the level of the ventral angles of the squamosals to the anterior ends of the premaxillae. The length along the curve of the arched profile, obviously, is in excess of that of the base-line, but not to the extent one would expect from the appearance of the skulls oriented as noted above. There is some variation in the degree of arching. The percentage of the base-line distance from the foramen magnum to the end of the rostrum, as against measurements from the same points along the curve of the dorsum is 105 (M.2966), 114 (M.5753), 108 (M.6110) and 110 (M.6111). In the young male ten feet in length (M.6110) the skull is more depressed than in the others and has the supraoccipital considerably longer in proportion to the condylobasal length, although less convex dorsally. The median length of the dorsal curve of the two smallest skulls is affected by the prominent posterior supraoccipital hump, which is much lower in M.6110 and absent in the adult.

In the skull of M.2966 the distance between the occipital condyles and the posterior level of the exoccipitals is very short, only one-sixth of that in the other two small skulls.

The relative depth of the maxillae, measured from the point where they reach the premaxillae at the anterior end of the supraoccipital, is variable, and may differ in the right and left bones, in which case the greater depth is cited in the table.

Measurements alone do not demonstrate adequately the differences between the largest skull and that of juveniles. A review of the limited number of South Australian skulls available shows that the posterior supraoccipital hump, the rounded summit of which is the vertex, is a character of the very young. This tumidity becomes

far less prominent after a body length of ten feet is attained (Beddard's 1903 figures show little indication of it beyond a slight elevation of the median dorsal ridge anterior to the "O" on his fig. 1 on pl. IX). In the larger of the Kangaroo Island specimens, with the skeleton almost 16 feet in length, the vertex is not far back from the anterior end of the supraoccipital and the carina behind this is continuous, slightly concave and rising very little at the site of the juvenile rounded hump.

In the skull, over 157 cm. in length, of the old adult the posterior part of the otherwise strong median dorsal ridge is flattened, with no indication of an elevation—in fact the carina begins to curve upwards at a point about one-third of its length from the foramen magnum; thence it is but little curved in profile and is slightly concave not far posterior to the short gentle convexity before the anterior end of the supraoccipital.

The sharp-edged lateral occipital ridges also alter with growth. The skulls 67 cm. and 70 cm. in overall length have their margins evenly curved and very slightly bent down excepting near the anterior ends. In the male ten feet in length, with 84 cm. skull, the lateral ridges show indications of upturning at about the middle of their length. The 123 cm. skull of the Kangaroo Island specimen exhibits a more apparent upturn of the ridges, particularly in the exoccipital-squamosal part, so that in sideview the median dorsal carina is hidden at the extreme posterior end (see also Oliver, 1922, pl. 1). In the old adult, with skull 157.5 cm. in length, the uprising of this lateral ridge hides the posterior half of the supraoccipital when the skull is viewed from the side (cf. fig. 3 and 4 herein). It must be noted that the last-named drawings are from photographs taken to show the dorsal contour of the skull; therefore there is some distortion of the lateral parts, particularly apparent in the frontal and squamosal.

The mid-length depth of the mandibles increases, relatively, with age, but on the other hand the bulla of the ear bones of the young is not only smoother, but proportionately strikingly larger, than in the adult or even in an example 16 feet in length.

In the last pair of ribs the width-length is taken from the longer of the pair. The ribs of the young male M.6110 were tagged in sequence as they were removed from the carcass.

Beginning with the eighth pair the widening of the posterior ribs, so marked in all but the last, becomes apparent; the length of the ribs in table 2 is taken in a straight line from head to distal end.

BONY RIBS  
TABLE 2. GREATEST WIDTH OF BLADE TO LENGTH OF POSTERIOR RIBS OF THREE JUVENILES AND ONE ADULT

Reg. No.	M.2966			M.5753			M.6110			M.6111		
	Width	Length	Per Cent	Width	Length	Per Cent	Width	Length	Per Cent	Width	Length	Per Cent
8 .....	35	398	8.7	38	380	10.0	35	450	7.7	55	870	6.3
9 .....	42	420	10.0	55	385	14.2	45	485	9.2	—	—	—
10 .....	47	416	11.3	55	395	13.9	60	495	12.1	—	—	—
11 .....	45	422	10.6	56	405	13.8	60	510	11.7	85	900	9.1
12 .....	50	410	12.1	60	420	14.2	60	500	12.0	120	850	14.1
13 .....	51	375	13.6	65	425	15.2	65	495	13.1	150	800	18.7
14 .....	40	340	11.7	65	430	15.1	62	470	13.1	140	750	18.6
15 .....	30	273	10.9	60	425	14.1	50	415	12.0	—	—	—
16 .....	16	205	7.8	40	320	12.5	35	340	10.3	—	—	—
17 .....	—	—	—	25	280	8.9	19	250	7.6	—	—	—

With the material in hand the data are too meagre to allow any very definite conclusions, particularly as so many of the posterior ribs of the adult are missing and those available are more or less damaged. However, in the four examples the thirteenth rib is widest in relation to the length while in general the eighth to eleventh tend to become longer in proportion to the width.

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#### EXPLANATION OF PLATE 48

A young male *Caperea marginata*, ten feet in body length, stranded on flat at Port Lincoln Bay (upper photograph by courtesy Mr. H. W. Dorward, lower by Mr. C. L. Gill).